REMARKS

Reconsideration of the above-identified application is respectfully requested.

Claims 1-17 are pending in the present application.

In the Office Action of December 21, 2004, which has been made FINAL, the Examiner rejected Claims 1-17 under 35 U.S.C. §102(b), as allegedly being anticipated by US Patent No. 5,495,265 issued to Hartman, et al. (Hartman). Applicants respectfully traverse the Examiner's rejections for at least the reasons set forth below.

Applicants respectfully amend independent Claims 1, 6, 11, 14, 16 and 17 to patentably distinguish over the cited Hartman reference.

Moreover, Claims 2-5, 7-10 and 12-13 and 15 are allowable at least because they depend from an now allowable base amended claims.

In regard to Claims 1, 6, 11, 14, 16 and 17, the Examiner cites Hartman for teaching that the "overdrive controller 10-21 <u>stores predicted capacitance values</u> and calculates overdrive voltage based on <u>predicted capacitance</u>."

However, as now set forth in amended Claims 1, 6, 11, 14, 16 and 17, it is clarified that the predicted capacitance value includes a <u>dynamic component</u> as well as a static component. Thus, for clarity, each of these independent claims are being amended to set forth that the <u>predicted capacitance value accounting for dynamic changes in capacitance resulting from prior applications of voltages to said liquid crystal cell</u>. In support of this, it is submitted that in multiplexing addressing schemes, it is well-known that the electrical charge of the pixel (dominated by liquid crystal thin slab) is maintained

during the refresh cycle as the Thin-Film-Transistor (TFT) is shutdown. In such devices, simply applying a target voltage (Vn+1) does not necessarily lead to the same voltage at the end of the refresh cycle. Instead, the final voltage (Vn+1) is given as Vn+1*Cn+1=Cn*Vn+1, which means that it is also dependent on the capacitance in the previous state (Cn). Keeping this in mind, it is easy to understand that response enhancement is achieved by applying an excessive bias-voltage, which is determined by considering the capacitance. However, as described in the specification, two different concepts of capacitance are treated: (1) a Static capacitance which is defined as the equilibrium capacitance determined from the electric charge maintained in the pixel, assuming that the liquid crystal reorientation completes within a frame period; and, (2) a Dynamic capacitance which is defined as a transient capacitance <u>in response to change in the applied voltage</u>. It deals with the general response behaviors where the director response is not fast enough to catch up within the refresh cycle. The capacitance is not determined simply by the previous state but can be only <u>predicted as tracking the whole series of biasing</u>.

The present invention assumes the dynamic capacitance in general, where the overdrive scheme covers not only the static values (See page 15, line 11 through page 16 line 2, e.g., in discussion of "static" capacitance prediction and voltages (essentially, when configured as a non-recursive system) but also a variety of cases (page 16, line 4 through page 22 line 11), where it is discussed how recursive applications of the static capacitance method leads to severe error in calculation of overdrive voltages. The distinctive feature of the present disclosure is that all case are well handled by

introducing the dynamic capacitance, which is prepared by referencing to the precise director dynamics of the relevant liquid crystal device (e.g., by numerical simulation).

In the present specification, there are extensive descriptions on this dynamic capacitance; for instance, the passage in the specification on page 14, lines 28-31, describing the values of the capacitance predicting tables described in Figures 6 and 7, to wit:

> ... tables shown in Figs. 6 and 7 are composed based on data that changes from an equilibrium state (static state). If using a parameter other than the capacitance as the one that represents the state at a start point, the values obtained based on a transition from a static state can not be used for a transition from a non-equilibrium state (dynamic state), accordingly the values in the table must be replaced depending on the history...

Here, "history" refers to prior applied voltages or prior <u>series of biasing</u>. As further support for the notion of the <u>predicted capacitance</u> as comprising a dynamic component value <u>that accounts for dynamic changes in capacitance resulting from prior applications of voltages to the liquid crystal cell</u>, the Examiner is respectfully directed to the present specification at page 14, lines 18, where the capacitance predicting table of Figure 7 and use of interpolation is discussed, to wit:

> ...the first column shows the capacitance at a start point, while the first row shows the voltage to be applied, wherein the predicted capacitance values at 16.7ms later are shown in the table. In general, it is a rare case that the present capacitance matches the capacitance shown in the first column, so that an actual calculation is performed using interpolation. As seen from the table, both the range of capacitance and the range of applied voltage go beyond the gray scale range defined in equilibrium.

This notion of the predicted capacitance as comprising a dynamic component for correcting capacitance value changes resulting from prior applied voltages to said liquid crystal cell is now clarified in the amended independent Claims 1, 6, 11, 14, 16 and 17, and it is respectfully submitted that no new matter or new issues are being raised.

New claims 18-20 are being added to highlight the use of recursion in generating the predicted capacitance value while taking into account the dynamic component of the capacitance value with full support provided in the specification, e.g., in the discussion of the second example provided at page 16, lines 4-29 which is the example situation where a TN-LCD transitions from full-ON to full-OFF within one frame period in terms of brightness, however, the internal state does not reach the equilibrium state. The $C_{present}$ value cannot be obtained in the nonrecursive system (according to the first case) as it will lead to accumulated error. Thus, the invention implements a recursive system for estimating the capacitance at one frame period later based on said predetermined voltage to be applied and a certain capacitance value.

The use of recursion in generating the predicted capacitance value is additionally described in regard to the third example provided at page 17, lines 1-12 which is the example situation where a TN-LCD transitions, however the targeted brightness can not be reached within one frame period even with using the overdrive.

Respectfully, Hartman does not disclose an overdrive controller that includes the step (and means for) predicting a capacitance value that includes a dynamic component as stated in the amended claims. Nor does it teach such a recursive technique for predicting the capacitance accounting for the dynamic component.

Hartman is not suggestive of this technique. Hartman assumes the static capacitance and, at best, describes a proposal to elevate the overdrive voltage as a result of a liquid crystal's slow response (see Hartman at column 5, lines 25-39), for which he proposed simply to elevate. Even with this suggestion, however, there is no evidence in Hartman that indicates that the capacitance programmed in the lookup table, for example, is not limited to the static values. The shortcoming of this approach is that the equation does not always give the correct capacitance especially for slow response cases and the calculated voltages are error-prone.

Thus, amended Claims 1, 6, 11, 14, 16 and 17 of the present invention can not be anticipated by the Hartman reference in a 35 U.S.C. §102(b) sense. The applicants respectfully request that the rejection under 35 U.S.C. §102(b) be withdrawn.

In view of the above, it is respectfully submitted that this application is in condition for allowance. Accordingly, it is respectfully requested that this application be allowed and a Notice of Allowance issued. If the Examiner believes that a telephone conference with Applicant's attorneys would be advantageous to the disposition of this case, the Examiner is requested to telephone the undersigned.

Respectfully submitted,

Leopold Presser
Registration No. 19,827

SCULLY, SCOTT, MURPHY & PRESSER
400 Garden City Plaza, Suite 300
Garden City, New York 11530
(516) 742-4343

SF/LP:gc